## IN THE CLAIMS

Please amend the claims as follows:

1 (Currently Amended): A method of forming a metal-containing film on a substrate, the method comprising:

providing a <u>plurality of substrates on respective surfaces of a tier substrate holder</u> substrate in a process chamber of a batch type processing system;

heating the substrate substrates to a predetermined temperature where film deposition rate is independent of temperature;

flowing a pulse of a metal-containing precursor in the process chamber;

flowing a pulse of a reactant gas in the process chamber; and

repeating the flowing processes until a metal-containing film with desired film properties is formed on the substrate substrates.

- 2 (Original): The method according to claim 1, wherein the repeating comprises forming a metal-oxide film.
- 3 (Original): The method according to claim 1, wherein the repeating comprises forming at least one of a HfO<sub>2</sub> film, a ZrO<sub>2</sub> film, and a film containing a mixture of HfO<sub>2</sub> and ZrO<sub>2</sub>.
- 4 (Original): The method according to claim 1, further comprising flowing a purge gas in the process chamber.

- 5 (Original): The method according to claim 4, wherein the flowing a purge gas comprises flowing a flow rate between about 100sccm and about 10,000sccm.
- 6 (Original): The method according to claim 1, further comprising flowing a pulse of a purge gas in the process chamber when the metal-containing precursor and the reactant gas are not flowing.
- 7 (Original): The method according to claim 6, wherein the flowing a pulse of a purge gas comprises flowing a pulse duration between about 1sec to about 500sec.
- 8 (Original): The method according to claim 1, wherein the flowing a pulse of a metal-containing precursor comprises flowing a metal-containing precursor and a carrier gas.
- 9 (Original): The method according to claim 8, wherein the flowing a carrier gas comprises a flow rate between about 100sccm and about 10,000sccm.
- 10 (Original): The method according to claim 1, wherein the flowing a pulse of a reactant gas comprises flowing a reactant gas and a carrier gas.
- 11 (Original): The method according to claim 1, wherein the flowing a pulse of a reactant gas comprises flowing at least one of an oxidizing gas, a reducing gas, and an inert gas.
- 12 (Original): The method according to claim 11, wherein the flowing a pulse of an oxidizing gas comprises flowing an oxygen-containing gas.

Application No. 10/662,522 Reply to Office Action of October 28, 2005.

- 13 (Original): The method according to claim 12, wherein the flowing a pulse of an oxygen-containing gas comprises flowing at least one of O<sub>2</sub>, O<sub>3</sub>, H<sub>2</sub>O<sub>2</sub>, H<sub>2</sub>O, NO, N<sub>2</sub>O, and NO<sub>2</sub>.
- 14 (Withdrawn): The method according to claim 11, wherein the flowing a pulse of a reducing gas comprises flowing at least one of a hydrogen-containing gas, a siliconcontaining gas, a boron-containing gas, and a nitrogen-containing gas.
- 15 (Withdrawn): The method according to claim 14, wherein the flowing a pulse of a hydrogen-containing gas comprises flowing H<sub>2</sub>.
- 16 (Withdrawn): The method according to claim 14, wherein the flowing a pulse of a silicon-containing gas comprises flowing at least one of SiH<sub>4</sub>, Si<sub>2</sub>H<sub>6</sub>, Si<sub>2</sub>Cl<sub>6</sub>, and SiCl<sub>2</sub>H<sub>2</sub>.
- 17 (Withdrawn): The method according to claim 14, wherein the flowing a pulse of a boron-containing gas comprises flowing a gas with the formula  $B_xH_{3x}$ .
- 18 (Withdrawn): The method according to claim 14, wherein the flowing a pulse of a the boron-containing gas comprises flowing at least one of BH<sub>3</sub>, B<sub>2</sub>H<sub>6</sub>, and B<sub>3</sub>H<sub>9</sub>.
- 19 (Withdrawn): The method according to claim 14, wherein the flowing a pulse of a nitrogen-containing gas comprises flowing NH<sub>3</sub>.

- 20 (Original): The method according to claim 1, wherein the providing comprises providing at least one of a semiconductor substrate, a LCD substrate, and a glass substrate.
- 21 (Original): The method according to claim 20, wherein the providing comprises providing a Si substrate or a compound semiconductor substrate.
- 22 (Original): The method according to claim 1, wherein the providing comprises providing a substrate containing an interfacial film selected from an oxide film, a nitride film, an oxynitride film, or mixtures thereof.
- 23 (Original): The method according to claim 1, wherein the providing comprises providing a batch of about 100 substrates or less.
- 24 (Original): The method according to claim 1, wherein the providing comprises providing a substrate with a substrate diameter greater than about 195 mm.
- 25 (Original): The method according to claim 1, wherein the flowing a pulse of a metal-containing precursor comprises flowing a pulse duration between about 1sec and about 500sec.
- 26 (Original): The method according to claim 1, wherein the flowing a pulse of a reactant gas comprises flowing a pulse duration between about 1sec and about 500sec.
- 27 (Original): The method according to claim 1, wherein the heating comprises heating the substrate to between about 100°C and about 600°C.

- 28 (Original): The method according to claim 1, wherein the heating comprises heating the substrate to below about 200°C.
- 29 (Original): The method according to claim 1, wherein the flowing a pulse of a metal-containing precursor further comprises flowing a metal-containing precursor liquid into a vaporizer at a flow rate between about 0.05ccm and about 1ccm.
- 30 (Original): The method according to claim 1, wherein the flowing a pulse of a reactant gas comprises flowing a flow rate between about 100sccm and about 2,000sccm.
- 31 (Original): The method according to claim 1, further comprising providing a process chamber pressure less than about 10Torr.
- 32 (Original): The method according to claim 1, further comprising providing a process chamber pressure between about 0.05Torr and about 2Torr.
- 33 (Original): The method according to claim 1, further comprising providing a process chamber pressure of about 0.3Torr.
- 34 (Original): The method according to claim 1, wherein the repeating comprises forming a metal-containing film with a film thickness less than about 1000A.
- 35 (Original): The method according to claim 1, wherein the repeating comprises forming a metal-containing film with a film thickness less than about 200A.

- 36 (Original): The method according to claim 1, wherein the repeating comprises forming a metal-containing film with a film thickness less than about 50A.
- 37 (Original): The method according to claim 1, further comprising annealing the metal-containing film at a temperature between about 150°C and about 1000°C.
- 38 (Original): The method according to claim 1, further comprising depositing an electrode film comprising at least one of W, Al, TaN, TaSiN, HfN, HfSiN, TiN, TiSiN, Re, Ru, Si, poly-Si, and SiGe.
- 39 (Withdrawn): The method according to claim 1, further comprising flowing a pulse of a nitrogen-containing gas in the process chamber.
- 40 (Withdrawn): The method according to claim 39, wherein the repeating comprises forming a metal-oxynitride film.
- 41 (Withdrawn): The method according to claim 39, wherein the repeating comprises forming at least one of a  $Hf_xO_zN_w$  film, a  $Zr_xO_zN_w$  film, and a film containing a mixture of  $Hf_xO_zN_w$  and  $Zr_xO_zN_w$ .
  - 42 (Withdrawn): The method according to claim 39, wherein:

the flowing a pulse of a metal-containing precursor comprises flowing at least one pulse,

the flowing a pulse of a reactant gas comprises flowing at least one pulse, and

Application No. 10/662,522 Reply to Office Action of October 28, 2005.

the flowing a pulse of a nitrogen-containing gas comprises at least one pulse.

- 43 (Withdrawn): The method according to claim 1, further comprising flowing a pulse of a silicon-containing gas in the process chamber.
- 44 (Withdrawn): The method according to claim 43, wherein the repeating comprises forming a metal-silicate film.
- 45 (Withdrawn): The method according to claim 43, wherein the repeating comprises forming at least one of a  $Hf_xSi_yO_z$  film, a  $Zr_xSi_yO_z$  film, and a film containing a mixture of  $Hf_xSi_yO_z$  and  $Zr_xSi_yO_z$ .
  - 46 (Withdrawn): The method according to claim 43, wherein:

the flowing a pulse of a metal-containing precursor comprises flowing at least one pulse,

the flowing a pulse of a reactant gas comprises flowing at least one pulse, and the flowing a pulse of a silicon-containing gas comprises at least one pulse.

- 47 (Withdrawn): The method according to claim 43, further comprising flowing a pulse of nitrogen-containing gas in the process chamber
- 48 (Withdrawn): The method according to claim 47, wherein the repeating comprises forming a nitrogen-containing metal-silicate film.

Application No. 10/662,522

Reply to Office Action of October 28, 2005.

49 (Withdrawn): The method according to claim 47, wherein the repeating comprises forming at least one of a  $Hf_xSi_yO_zN_w$  film, a  $Zr_xSi_yO_zN_w$  film, and a film containing a mixture of  $Hf_xSi_yO_zN_w$  and  $Zr_xSi_yO_zN_w$ .

50 (Withdrawn): The method according to claim 47, wherein:

the flowing a pulse of a metal-containing precursor comprises flowing at least one pulse,

the flowing a pulse of a reactant gas comprises flowing at least one pulse, the flowing a pulse of a nitrogen-containing gas comprises at least one pulse, and the flowing a pulse of a silicon-containing gas comprises at least one pulse.

Claim 51 (Canceled).

- 52 (Original): The method according to claim 1, wherein the heating comprises heating the substrate under isothermal heating conditions.
- 53 (Withdrawn): The method according to claim 1, wherein the flowing a pulse of a metal-containing precursor comprises flowing a metal alkoxide.
- 54 (Withdrawn): The method according to claim 53, wherein the flowing a metal alkoxide comprises flowing at least one of M(OMe)<sub>4</sub>, M(OEt)<sub>4</sub>, M(OPr)<sub>4</sub>, and M(OBut)<sub>4</sub>.
- 55 (Withdrawn): The method according to claim 53, wherein the flowing a metal alkoxide comprises flowing at least one of a hafnium alkoxide and a zirconium alkoxide.

Application No. 10/662,522

Reply to Office Action of October 28, 2005.

56 (Withdrawn): The method according to claim 53, wherein the flowing a metal alkoxide comprises flowing at least one of Hf(OBut)<sub>4</sub> and Zr(OBut)<sub>4</sub>.

57 (Withdrawn): The method according to claim 53, wherein the flowing a metal alkoxide comprises flowing at least one of M(OR)<sub>2</sub>(mmp)<sub>2</sub> and M(mmp)<sub>4</sub>.

58 (Original): The method according to claim 1, wherein the flowing a pulse of a metal-containing precursor comprises flowing a metal alkylamide.

59 (Original): The method according to claim 58, wherein the flowing a metal alkylamide comprises flowing at least one of a hafnium alkylamide and a zirconium alkylamide.

60 (Original): The method according to claim 58, wherein the flowing a metal alkylamide comprises at least one of Hf(NEt<sub>2</sub>)<sub>4</sub>, Hf(NEtMe)<sub>4</sub>, Zr(NEt<sub>2</sub>)<sub>4</sub>, and Zr(NEtMe)<sub>4</sub>.

61 (Currently Amended): The method according to claim 1, wherein:

the providing comprises providing a plurality of substrates in said process chamber,

and

the repeating comprises forming an HfO<sub>2</sub> film on each of the plurality of substrates, the plurality of substrates each film having a thickness of about 30A to about 50A and a WIW uniformity of about 10% to about 15%.

62 (Currently Amended): The method according to claim 1, wherein:

Reply to Office Action of October 28, 2005.

the providing comprises providing a plurality of substrates in said process chamber, and

the repeating comprises forming an HfO<sub>2</sub> film on each of the plurality of substrates, the plurality of substrates each film having a thickness of about 20A to about 50A and a WIW uniformity of about 20% or less.

63 (Currently Amended): The method according to claim 1, wherein:

the providing comprises providing a plurality of substrates in said process chamber,
the repeating comprises forming an HfO<sub>2</sub> film on each of the plurality of substrates,
and

the heating comprises heating within a temperature range at which film deposition rate is independent of temperature.

64 (Original): The method according to claim 63, wherein said heating comprises heating within a temperature range of about 160 to 180°C.

65 (Withdrawn): A computer readable medium containing program instructions for execution on a processor, which when executed by the processor, cause a batch substrate processing apparatus to perform the steps in the method recited in claim 1.

Claims 66-77 (Canceled).

78 (New): The method of Claim 1, wherein said flowing steps provide a deposition rate of about 1 angstrom per cycle.